CLEANTHES OR POSIDONIUS?

THE BASIS OF STOIC PHYSICS

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The first thesis of Stoic theology to be proved in Book II of Cicero's *De natura deorum* is *esse deos* [1]). The proofs are of the most diverse kind. Some are dialectical in the sense of operating with *ἔνδοξα*, others are severely rational with an emphasis on syllogistic stringency, and still others may be classed as "physical" inasmuch as they are drawn from a consideration of the Cosmos and a theory regarding the basic substance or power at work in it. The chapters embodying these proofs have often been analyzed and there has been a considerable amount of discussion about the source or sources from which Cicero derived these proofs [2]).

We wish here to concentrate on a relatively small section in this first part of Book II and to examine once more the question of its source. The arguments of this section (II, 23–32 *mundum*) are distinctly of the "physical" type [3]); all of them lead us to recognize the significance of one particular *vis*, the *vis caloris*. From this concept we arrive in the end by a brief and simple step at the Stoic idea of the deity.

In the first two paragraphs (23f.) the *vis caloris* is seen to be the agent of growth in all plants and animals [4]); physiological observations here presented acquaint us with the manifestations and the effects of this power. Throughout these paragraphs we remain in the realm of biological entities. For the next section Cicero promises a *subtilius explicare* of this peculiar power. To implement the promise he considers successively each of the major parts of the world (*partes mundi* ... *maximas*), pointing out the

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1) *De nat. deor.* II, 3; cf. 4–44. For the early Stoic philosophers I refer throughout this paper to *St*(oicorum) *V*(eterum) *F*(ragmenta) *collegit* Joannes ab Arnim (4 vol.s, including the *Index* of Maximilianus Adler, Leipzig, 1903–1924).

2) For a survey of the theories advanced see A. S. Pease, *M. Tulli Ciceronis de nat. deor.* (2 vols., Cambridge, Mass., 1955–1958) 1.45ff.

3) cf. 23 *init.*: *rationibus physicis id est naturalibus.*

4) *ali et crescere* (twice in 23) = *τρέφεσθαι καὶ αὔξεσθαι*, a combination of verbs often to be found in Greek texts. Cf. *A. J. Ph.* 74 (1953). 46f. It seems safe to assume that Cicero's *calor* corresponds to Greek *θερμασία* or *τὸ θερμόν*. In some Greek authors it is very important to observe the distinction between *πῦρ* and *τὸ θερμόν*. Here it seems of small importance. *calor* (23f.) and *hoc igneum genus* (25) are used interchangeably and I do not have the impression that the difference between the substance called fire and the *δύναμις* (or *ποιότης*) represented by the *θερμόν* is in any way essential. Cf. *St. V. F.* II, 580 *εἶναι δὲ τὸ μὲν πῦρ τὸ θερμόν*. Cicero's *calidum* et *igneum* (23) may render *τὸ θερμὸν καὶ πυρῶδες*. Pease's note (II, 604) in which he speaks of Cicero's "paired terms" as "good example ... of his *ubertas*" is not very fortunate; of the paired terms which he adduces some, and perhaps even all, render Greek "pairs".

crucial importance of the *genus igneum* in each of them [5]). The major parts of the world are identical with the elements – or with the elements as cosmic strata –, the sequence being the customary: earth, water, air, and finally the substance sometimes called fire and sometimes aether. We may suspect that in the last instance the presence of the *ignea vis* is almost a foregone conclusion but this could of course only be welcome. To say it once more, the proofs by which Cicero establishes the importance of this power begin in the realm of biology and from there move on to cosmology. There can be no doubt that the *vis caloris* has its original and basic place in biological thought. We shall soon see how well established it was in this context.

Two questions suggest themselves at this point. Can we trace the *vis caloris* back to pre-Stoic thought? and, who was the Stoic thinker who accepted it in its biological significance (contributing perhaps new arguments to emphasize this significance) and transferred the principle from biology to cosmology? Biological concepts and biological modes of thought have after all even in late Presocratic systems sometimes been given a wider, cosmic application [6]). We may speak of a trend in this direction, although it must be said that Plato and Aristotle show little inclination to fall in with this trend.

We shall in due course return to the first of our two questions; for the present it is better to concentrate on the second. The opinion which seems to have found widest acceptance regards Posidonius as Cicero's source and as the author of the proofs embodied in this section. Several scholars have supported this theory by impressive arguments, yet it is safe to say that none has done more to secure it credence than Karl Reinhardt who in his first book on Posidonius subjected the entire Second Book of *De natura deorum* to a most searching and penetrating analysis and in later publications returned to and elaborated his conclusions [7]). Many of these conclusions are entirely convincing so that Reinhardt himself could with full justification use them to buttress his persuasive thesis regarding Posidonius' intellectual personality. On

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[5]) 25–28. We shall see later that 30 *atque*... –32 is a sequel to 25–28.

[6]) CF. Jaeger, *The Theology of the Early Greek Philosophers* (Oxford, 1947) 15f.

[7]) See Reinhardt, *Poseidonios* (Munich, 1921) 224ff., *Kosmos und Sympathie* (Munich, 1926) 61ff., 70ff. *R.E.* s.v. Poseidonios 699ff; Pohlenz, *Die Stoa* (2 vols., Göttingen, 1948) 1.215f.; 2.106f.; I. Heinemann, *Poseidonius' Metaphys. Schriften* (2 vols., Breslau, 1921–1928) II. 176ff. R. Philippson (*Symb. Osloenses* 21, 1941, 24ff.) seems to stand alone in positing an early Stoic source for 23f and reckoning with a substratum of early Stoic thought even in 25–28. I find myself in agreement with some of his arguments and opinions.

the following pages Reinhardt's conception of Posidonius will not be called into question. All we wish to do is to consider whether Reinhardt was right in finding in our section characteristic features of the same Posidonius whose intellectual physiognomy he had recognized in so many other texts [8]).

It has of course never been overlooked that the biological part of our proof includes a reference to Cleanthes and an indication that some of his arguments are here summarized [9]). Yet Cicero has not made clear how far this report of Cleanthes' arguments extends. It would be conceivable that Posidonius incorporated a few thoughts of Cleanthes in a complex proof of his own and that not only every other observation and argument but also, and most particularly, the guiding idea is his own [10]). Cleanthes is cited for arguments *quanta vis insit caloris in omni corpore.* The minimum that we must give him is the content of this sentence: (*negat Cleanthes*) *esse ullum cibum tam gravem quin is nocte et die concoquatur; cuius etiam in reliquiis inest calor iis quas natura respuerit.* The sentence shows that Cleanthes found the *calor* (the *θερμόν*) active in the process of digestion. His observations can hardly be acclaimed as showing a high degree of originality. About the function of the fire or *τὸ θερμόν* in this process the essential information is to be found in the *Timaeus*; fuller and more specific accounts are given in Aristotle's biological treatises – Aristotle, incidentally, conceives of the digestive process as a "cooking" (whereas for Plato it is a "cutting") and also knows the argument from the *περιττώματα* (= *reliquiae*) [11]). Moreover we may confidently assume that both he and Plato had learned something on this subject from contemporary physicians (or medical researchers). Offhand there

[8]) The reasons which lead me to question Reinhardt's views concerning 23 = 32a have no bearing on the other parts of *De nat. deor.* II which Reinhardt assigns to Posidonius. Even 33–36 has no connection with 22–32a and uses a different method of argumentation. On 29f. see below p. 10. Particularly valuable and convincing is Reinhardt's suggestion that Cicero took many Stoic arguments from a schoolbook or textbook. In speaking on the following pages of Cleanthes as Cicero's source I never mean to exclude the possibility – or probability – that Cicero's immediate source was a handbook of the kind postulated by Reinhardt.

[9]) 24 *init.*

[10]) Von Arnim (*St. V. F.* I, (513) leaves the question open but seems convinced that Cleanthes' arguments reached Cicero via Posidonius. Note also his comments R.E. s.v. Cleanthes 565f. Still he appears to be relatively generous towards Cleanthes; for while it is difficult to find clear statements or commitments, the tendency as far as I can make out is to limit Cleanthes to *negat-respuerit* (24). S. Sambursky, *Physics of the Stoics* (London, 1959) 4 treats 23–28 as representative of the Old Stoa and has realized that the argument is all of one piece; unfortunately he speaks *charta eadem* with reference to II, 27f. of Cicero as a pupil of Posidonius.

[11]) For the last point see *de part an.* II, 2.649a26 (adduced by Pease) and *de. gen. an. II*, 3.737a4. See further below pp. 13f.

would seem to be more reason for citing Cleanthes for the immediately following observations: *iam vero venae et arteriae micare non desinunt quasi quodam igneo motu, animadversumque saepe est cum cor animantis alicuius evolsum ita mobiliter palpitaret ut imitaretur igneam celeritatem.*

We should not give too much weight to the fact that no other philosopher (and no medical authority) is associated with these opinions [12]). Still if we ask whether this set of arguments or the preceding one has a better claim to originality there can be no doubt about the answer. The sentence *iam ... celeritatem* may represent a philosopher's noble attempt to extend the power of the *θερμόν* to some additional physiological phenomena. The words *quasi*, *quodam*, and *imitari* show that the author of these thoughts proceeds cautiously; he does not simply assert that the fire operates; still less does he report widely held opinions about its operations.

These observations do not yet take us very far. It is much more important that there are strong reasons for attributing the content of § 23 to Cleanthes. Here we learn that the heat is in every living being responsible for its growth and nutritive processes and that it is inseparably associated with the *sensus* – the Greek word would be *αἴσθησις* – and *vita* of such beings, death being in fact an extinction of this heat. We need not hesitate to call the *θερμόν* the vital principle. A further very important point made in this context is that the *θερμόν* (or the fire) moves itself and acts *motu suo*. It is an *αὐτὸ αὑτὸ κινοῦν* [13]).

Cleanthes is recommended as the author of these ideas and arguments by a later passage of Book II (40f.) whose subject is again the *ignea vis* and whose thoughts are explicitly attributed to Cleanthes [14]). Two kinds of fire are here distinguished, one whose nature it is to destroy and consume things, and another

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[12]) Reinhardt (*R.E.* 713) has a very strong reason for believing that Posidonius spoke of the heart as "imitating" in its beat the movement of the fire but he has no reason for regarding him as the first to come forward with this striking idea. We shall presently see that it is wrong to think of Posidonius as the first proponent of the "Wärmelehre" (Cic. *de nat. deor.* II, 40f. suffices to exclude this; Edelstein, *A. J. Ph.* 57, 1936, 301 n. 61 opposes Reinhardt's theory on other grounds). The observations made on the *cor animantis*.. *evolsum* do not necessarily presuppose vivisection (Reinhardt *ibid.*; nor would vivisection necessarily be an argument for Posidonius); cf. Pease *ad loc.*

[13]) We shall return to this point (see p. 10).

[14]) The passage has of course been included in the collection of his fragments (I, 504 v. A.). The distinction between two kinds of fire has a very interesting history which we need not here trace. Note Pease's reference *ad loc.* to passages in Xenophon, Plato, Aristotle, and Theophrastus. Pease wisely refrains from going back to Heraclitus whom it is better not to credit with this destinction. Philippson's (*loc. cit.*, n. 7, 27) reference to Arist. *de gen. an.* II, 3.736 b 33ff. is particularly illuminating.

which in a sentence presenting itself as a translation from Cleanthes' own treatise is called *vitalis* and *salutaris*. The latter kind is evidently identical with the *igneum genus* or the *vis caloris* of 23ff. The descriptions here and there agree. In 41 it is said of the *ignis vitalis* that it *omnia conservat, alit, auget, sustinet sensuque afficit.* In 23 too the *vis caloris* is said to nourish and to make grow (*alere, augere*); and as we have just seen, *vita* and *sensus* of living beings are here too made dependent on the presence of the *calor*. The latter thought corresponds to the verbs *conservat, sustinet, sensu afficit* of 41. In both passages the *calor* or fire is the vital principle. Cleanthes must have known the *θερμόν* in this role. Anyone attributing 23f. to Posidonius should at least admit that Posidonius here has nothing original to offer [15]).

At the end of 24 the arguments of 23f. are summarized and the transition is made to the Cosmos. *omne igitur quod vivit, sive animal sive terra editum, id vivit propter inclusum in eo calorem.* Surely this is the conclusion to which every more specific statement of 23f. points ahead, and what is here finally formulated barely differs from what was asserted at the very beginning of our series of arguments: *omnia quae alantur et quae creseant contineant in se vim caloris sine qua neque ali possent neque crescere.* The step from *alere* and *crescere* to *vivere* was made in 23. It would hardly be necessary to emphasize this coherence of the argument if Reinhardt and Pohlenz had not contended that the early Stoics lacked the term *vis vitalis* (which occurs at the end of 24) [16]). Granted that the term is not used in the previous sentences and that it is nowhere else attested for the early Stoics, can we doubt that they had conceived the idea? In 41 Cleanthes speaks of the *ignis vitalis* which *alit, auget, sustinet.* How much more do we need? Moreover the early Stoics lacked neither the imagination nor the will to enrich the philosophical vocabulary by new terms [17]). If 23f are

[15]) Von Arnim (*loc. cit.* 565) found the Stoic *τόνος* in the *motus certus et aequabilis* (23). He may be correct. Yet the physiological process referred to is probably pulsation (*σφυγμός*). Cf. the *micare* of the blood vessels in 24. Aristotle *de iuv.* 26 treats pulsation as being caused by *θερμότης*

[16]) Reinhardt, *Pos.* 242f.; *Kosmos*, 329; Pohlenz, *Stoa.* II, 107; see however R. Philippson, *loc. cit.* (n. 7) 26.

[17]) The word *ζωτικός* is found in the technical vocabulary of Aristotle (see Bonitz s.v.), and of Theophrastus, and was in all probability also known to Epicurus (Lucr. III, 126: *ventus vitalis* = *πνεῦμα ζωτικόν*) and Cleanthes (Cic. *de nat. deor.* II, 40); Aristotle says *τὸ ὑφ' αὑτοῦ κινεῖσθαι ζωτικόν* (*Phys.* VIII, 4. 255a6). Note how close the argument of 23 is to this idea. Reinhardt, *Pos.* 242 asserts that Posidonius "ersetzt umdeutend den Begriff des Feuers als der Weltvernunft durch den Begriff des Feuers als einer organisch schöpferischen und bewegenden Kraft". *De nat. deor.* II, 40f. shows definitely that Cleanthes knew the fire not only as *νοερόν* and *τεχνικόν* but also as „schöpferisch". See also W. Crönert, *Gnomon* 6 (1930). 153 Reinhardt's last defense of his position (*R.E.*, 649) leaves me unconvinced.

translated from Posidonius, he cannot have done more than recapitulate and endorse Cleanthes' opinions.

Are we then to suppose that Posidonius took over Cleanthes' arguments for the power of the vital heat in organic beings and that it was he himself who extended this argument to the parts of the Cosmos and to the Cosmos as a whole? On this supposition the last thought of 24 would be his; here for the first time the vital heat is declared to *pertinere per omnem mundum*. Cleanthes would not have realized that the principle whose power he extolled operated also in the wider reaches of the physical world. Let us not call it unthinkable that Posidonius found in the writings of one of the *ἀρχηγέται* arguments somewhat limited in scope and for his feeling rather earthbound yet sound enough to serve as springboard for his own bolder flight. If he accepted these arguments he would not be a rebel but only an innovator. Yet on our ledger of probabilities there are also some entries to be made for Cleanthes. Cleanthes was after all not a biologist. It is improbable that he scrutinized the phenomena of life and growth with the intention of finding a principle fundamental for, yet confined to, them. Such departmentalism would be conceivable in Aristotle but we have never learned to associate it with the Stoics. That Cleanthes' philosophical interests embraced the elements of the physical world and this world itself in its totality, that he speculated about the nature of the heaven and the nature of the gods are facts too well known to require proof or lengthy discussion [18]). Like Zeno he regarded the fire as the *στοιχεῖον*, the basic and enduring element. Our evidence (if we disregard *de nat. deor.* II, 22ff.) presents his cosmological doctrines partly under the categories of *ὕλη* and *λόγος*, partly with emphasis on the subjects of cosmic origins and destruction [19]); it contains no proofs for the presence of fiery heat in every major part of the Cosmos. Still given the importance of the fire in his physics and cosmology, it is easy to believe that he advanced such proofs, and there is certainly nothing in the balance of the evidence that would conflict with the thoughts of *de natura deorum* II, 25–28. In the discussion of the elements we cannot reasonably expect to find biological concepts such as *alere*, *crescere*, *augere* or anything analogous to the "cooking" of the food or the beating of veins and arteries. Yet the final conclusion of our argument assigns to the fire or heat of the Cosmos a role entirely corresponding to its place in the biological theory: it is the

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[18]) Frgg. 493ff. Note in particular the *testimonia* which von Arnim has placed close to Cic. *de nat. deor.* II, 24 (frg. 513).

[19]) See frgg. 493, 497, 511f.; cf. the preceding note.

sustaining and preserving power [20]). All elements *continent in se* a considerable amount (or *δύναμις*) of this principle; it is as much *insitum* and *inclusum* in them as it is in the biological entities.

Regarding the fourth and last part of the Cosmos, the heavenly region, it would not be correct to speak of the fire merely as *insitum*. Here there is nothing but fiery heat; no other material or power is mixed with it [21]). The fire which elsewhere in the world is mixed with earth, water, and air is here to be found in its pure essence, unalloyed and unimpaired. Therefore it is natural to consider this region as something like the home of the cosmic and vital fire (it is not quite easy to say what Greek conceptions lie behind the Latin yet we may remember that the outermost stratum of the world had long been the cosmic *τόπος* of the fire [22]), and it would also be Greek to say that the fire or *θερμόν* dispersed through the Cosmos *ἤρτηται ἐκ* that concentrated on high). There is room for the impression that the author of our argument, having reached this point, feels inspired to make even bolder claims for his fiery principle. In the early parts of the argument the vital heat had not been described as being or having the *procreandi vis* and the *causa gignendi* [23]). Now this is assumed, and shortly afterwards we learn that it is also the cause of movement and of *sensus*, a thought clearly meant to apply to organic beings [24]). Yet even if these statements go slightly beyond the original data we still need not suppose that a new and bolder author has taken over,

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[20]) II, 28.

[21]) *Ibid.* 27 (second half). Observe that the words *salutaris et vitalis calor* correspond to (*ignis*) *vitalis et salutaris* in 41 where they are a part of the *verbatim* quotation from Cleanthes (cf. Pease's note on 27). The words *alit, auget, sustinet* occur at the end of the quotation. In a section likely to go back to Posidonius (II, 117; cf. Reinhardt, *R.E.* s.v. 702) it is the *aer ... calore* (*caeli*) *temperatus* which furnishes living things with *vitalis et salutaris spiritus*. The differences between this thought and Cleanthes' conception are obvious. — The early Stoics certainly spoke of the *δύναμις τοῦ θερμοῦ;* in this basic and literal sense it is correct to credit them with "thermodynamic notions" (Sambursky, *op. cit.* 4).

[22]) See below (p. 20).

[23]) II, 29 goes in this respect farther than 23f.; but see below p. 13f. on the *θερμόν* as *γόνιμον*.

[24]) II, 31. Some kind of *motus* is mentioned in 23 and *sensus* too is there said to be present. But this *motus* is not locomotion. The points made in 23 would probably permit their author to hold that in perception and locomotion soul *πνεῦμα* is active, a vital force not simply to be identified with the *calor*. Cf. below pp. 17ff. *sensus* in 28 need not render *αἴσθησις* in the meaning of perception. Note in this connection III, 36 (especially *sentiat et voluptatem et dolorem*). I hardly think that in II, 30f. the Cosmos is meant to have perception or the sense functions. *αἴσθησις* (as well as *sensus*) is also used of bodily feeling and sensitivity. Cf. on the dual meaning of *αἴσθησις* my paper," *αἴσθησις* in Aristotelian and Epicurean Thought" (Letterkundige Mededelingen der Koninklijke Nederl. Akad. van Wetensch, Afd. Letterkunde. Nieuwe Reeks, deel 24, no. 8.)

a man of vision and intuition who overrides the caution of a pedant. To sum up, while the cosmological argument cannot be a replica of the biological, there is no essential difference between the outlook of 23f. and that of 25–28.

Another point should not go unnoticed. We have mentioned that quite early (23) in the extracts from Cleanthes the heat and the fire are described as self-movers: *omne quod est calidum et igneum cietur et agitur motu suo.* A self-mover would be what the Greeks call an ἀρχή, and this honor is indeed suitable for an entity so autonomous and of such creative power. The cosmological section which we have so far considered (25–28) includes no reference to self-motion. Yet if we read on – either skipping 29f. or proceeding by way of them [25]) – we find in 31f. an argument in which the self-moving quality of our principle is once more asserted, this time with reference to the fiery substance of the celestial region where the *calor* exists in its original purity and in a condition far superior to its other manifestations. A proof whose wording suggests Platonic and Aristotelian antecedents secures absolute autonomy and self-moving power for the fiery substance of the Cosmos. Plato is specifically cited for his statement that what moves itself is better – indeed *divinius* – than what is moved by another power impelling it from the outside. Plato had equated the self-moving entity with the soul [26]). The author of our argument readily accepts this equation and concludes that the *calor* of the world, being a self-mover, must be a soul (*animus*) and therefore the world itself a living being (*animans*) [27]).

If there were good reasons for separating the two assertions of selfmoving power in the vital heat from one another and ascribing them to different authors, Cleanthes would have lost out. In the absence of such reasons it seems natural to regard the two statements as parts of one and the same conception. On this view it

[25]) I agree with Reinhardt (Pos. 226, *R.E.* s.v. 700) that the section in question (29–30 *contineri*) is not germane to the argument of 23–28 and of 30 (*atque* . . .)ff. It is true that the θερμόν is only the physical aspect of the creative force and one would expect to find the emphasis on this aspect balanced by a reference to the rational aspect, i.e. the λόγος. Cf. Pohlenz, *Gött. Gel. Anz.* 1922. 171 n. 2; Heineman *op. cit.* (note 7) II, 177. But I cannot see how 29f. could supplement the arguments of 23–28 in this sense. Cicero may have skipped a point; for the least that we should need to connect 29 with the preceding arguments would be an identification of the *calor* with *natura*. But even this supposition would not help us very much.

[26]) Pl. *Phaedr.* 245a, *Legg.* 10.894b ff. are pertinently cited by Pease *ad loc.* The Aristotelian passages adduced by Pease seem to me less to the point. I should prefer to compare *de caelo* I, 9.279a 33ff., bearing in mind that Aristotle here adopts arguments previously set forth in one of his dialogues (presumably *de philosophia*); cf. Jaeger, *Aristotle* (2nd Engl. ed. Oxf., 1948) 301. See also Philippson *loc. cit.* (n. 7) 28.

[27]) See Note 25.

becomes possible to understand how our author proceeded [28]). We must bear in mind that in its full glory and purest essence the *ignea vis* is present only in the celestial region. Yet the Stoic author thought it wise (and we shall still see why it was practically necessary) to begin with the objects which he himself calls *nobis nota* [29]). Dealing with the heat in the living beings on earth he says briefly that all that has the nature of this heat *cietur et agitur motu suo* [30]). The actual proof for this contention, the resounding proclamation of this idea, and the triumphant inference that this heat must be the soul of the Cosmos are all reserved for the last phase of the argument. They must wait until he has come to deal with this heat in its purest, its original, and its most mobile condition. This procedure seems to be perfectly logical – quite apart from its being very impressive. Can anyone assure us that Cleanthes would not wish to give his arguments climactic structure? It should also be evident that Plato's proofs for the soul as self-mover, relating as they do to the World Soul, could be much more convincingly incorporated at the point where the vital heat had already emerged as the great sustaining cosmic principle – to transfer them to the *θερμόν* active in the growth and nutrition of living beings would have been rather incongruous. Cleanthes' could define the world soul in terms very similar to those used by Plato but his world soul is definitely a material entity, the *calor*; and what Cleanthes asserted of the soul: *ψυχὴν δι' ὅλου διήκειν ἧς μέρος μετέχοντας ἡμᾶς ἐμψυχοῦσθαι* hardly differs from what Cicero says of the *calidum et igneum: ita in omni fusum esse natura ut in eo sit procreandi vis et gignendi a quo et animantia omnia et nasci sit necesse et augescere* [31]). If we once reconcile ourselves to the fact that the Stoics, in opposition to Plato and Aristotle, gave the soul a material nature, we can appreciate what they achieved.

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[28]) In the second half of 32 the arguments are no longer *physicae rationes*. The tenor of the argmentation changes palpably and it continues to be different in 33ff. M. van den Bruwaene, *La théologie de Cicéron* (Louvain, 1937), 86ff. contends that there is no break or change anywhere in the reasoning of 23–44 but I do not think that he has proved his case. Reinhardt (*Pos.* 227) regards 39 *atque hac* as the sequence of 32. This is possible but I see no cogent reason for taking this view.

[29]) 30 *fin.* — The Stoics describe also the individual soul as a self-mover (Zeno in *St. V. F.* I, 135f.) but in their scheme this soul is not simply identical with the vital heat. It is the heat transformed into *pneuma*, an aspect of the *calor* theory to which we shall come back.

[30]) 23. Note the incomparably more elaborate form in which this idea is expressed in 31 and 32. Three causes of motions, *natura, vis, voluntas* were distinguished by Aristotle in *de philosophia* (see 44, and Pease *ad* 32 and 44). In his treatises, most notably in *Physics* VIII, he operates with the customary dichotomy (*τὸ αὐτὸ κινοῦν, τὸ ὑπ' ἄλλου κινούμενον*) which our Stoic author in 32 adopts from Plato.

[31]) St. *V. F.* I, 495; *de nat. deor.* II, 28 *fin.*

Their material soul builds up and sustains the body (this corresponds to the *θρεπτικόν* and *αὐξητικόν* of Aristotle's soul); it keeps the body alive (as Plato and Aristotle had insisted that soul should); it provides living beings with the sense functions or perceptions and with the capacity of movement (all this is again Aristotelian psychology [32]) but also with rationality (as in Plato and Aristotle the *νοῦς* is a part of the soul); and in addition to all this the Stoic soul concept preserves the Platonic identity or continuity between the individual soul and the power which sustains and animates the Cosmos. – We can also now understand how the "textbooks" could record that the Stoic deity – and indeed specifically Cleanthes' deity – was defined as *mundus*, as *naturae mens et animus*, as *caeli ardor* (= *aether*), and as *κόσμου ψυχή* [33]). Each of these definitions could be found in our section. That the deity is fire happens to be attested only for the *Stoici* in general – and for Zeno [34]). We need not doubt that it was also Cleanthes' doctrine.

The idea that Posidonius accepted the biological observations of Cleanthes and proceeded to give them an application and a cosmological or religious significance of which poor Cleanthes had never dreamed may still have its appeal — for in the measure in which we have learned to admire Posidonius' genius and originality Cleanthes' stature has inevitably, if undeservedly, shrunk. Let us at least give Cleanthes credit for his gift of historical anticipation thanks to which he supplied Posidonius with all that he needed to open up wider cosmological vistas. Cleanthes had realized that the vital heat in plants and animals was a self-moving principle. To transfer Plato's cosmic principle to the life force in organic entities was a remarkable feat but one is bound to wonder what real gain Stoic philosophy could derive from this new *ἀρχή* if its manifestations were to be restricted to biology and the Cosmos was not allowed to benefit from it [35]).

It is time for us to take up our other question; for when we examine the previous history of the *calor vitalis* we shall realize even more clearly how pointless it would be for a philosopher to

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[32]) To act in these functions the *θερμόν* must have undergone some change, i.e. it must have become *πνεῦμα*; see below pp. 17ff. Cf. for these Stoic soul functions my paper cited in Note 24.

[33]) *De nat. deor.* I, 37 = *St. V. F.* I, 530; see also 531.

[34]) *St. V. F.* I, 157; II, 423.

[35]) I fail to find in 25–28 any specific thought that might point to Posidonius as author of the arguments. It surely is idle to speculate whether the *multae rationes* whose omission is indicated in 26 were theoretical (and therefore Cleanthes') reasons or whether they included empirical observations (characteristic of Posidonius). We have no right to suppose that Cleanthes could only argue in the form of syllogisms. See further concerning the thoughts of this section below Notes 74f.

set forth the thoughts of 23f. unless he wished to use them as the basis for larger conclusions. In the early third century it was reasonable to equate the soul with the vital heat but no great intellectual effort was required for it. The vital heat is not a discovery of the Stoics. That the *θερμόν* in us has the control of life and death, that it has productive powers, that it is active in nutrition and in metabolism and by this token also in organic growth are insights that had been familiar for generations. Some thoughts of the physiological section 23f. can be traced back as far as Empedocles. *refrigerato et extincto calore occidimus ipsi et extinguimur* corresponds to a doctrine attested for him; another doctrine recorded by the doxographers under his name is *τὰ ζῷα . . . αὔξεσθαι διὰ τὴν παρουσίαν τοῦ θερμοῦ, μειοῦσθαι δὲ καὶ φθίνειν διὰ τὴν ἔκλειψιν*[36]). Combined these doctrines suffice to establish the *θερμόν* as the power which controls our life. There is some evidence (and it also is intrinsically probable) that Empedocles' physiological teachings were preserved and developed by the "Western" school of medical thought, i.e., by men like Philistion, and that Aristotle was familiar with the work of this school[37]). In Aristotle's own biology and zoology the *θερμόν* has an important – indeed, one might say, a crucial – position, but whenever we find it in the *Parva Naturalia* or in the zoological treatises associated with an important biological function we should think very hard before we give Aristotle himself the credit for the idea. In some instances the most that he may have done would be to refashion an inherited theory. Thus when he describes the *θερμόν* as agent of digestion he may have refashioned but he cannot be wholly original; for the *θερμόν* has essentially the same function in the *Timaeus*[38]). However this is not the place to pursue such questions; we must content ourselves with recording his principal *placita*.

Aristotle knows the vital heat as agent of growth – he can therefore argue that animals having little innate heat are relatively small – and assumes it to be present in every *sperma*; in fact it is the power which makes the seed fertile. Thus it has the *γόνιμον*

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[36]) Scil. of the *θερμόν* and of another power (which the condition of the text does not allow us to identify); see *Die Fragmente der Vorsokratiker* edid. H. Diels and W. Kranz (9th ed., Berlin, 1960) 31A77, 85. For what follows cf. Franz Rüsche, *Blut, Leben und Seele. Ihr Verhältnis nach Auffassung der . . . Antike* etc. (Paderborn, 1930) 127ff., 188ff.

[37]) Cf. e.g. Max Wellmann, *Die Fragmente der Sikelischen Ärzte* (Berlin, 1901) 76ff.; Jaeger, *Hermes* 48 (1913) 50ff. (= *Scripta Minora*, 2 vols., Rome, 1960, 1.78ff.); also my papers "Tissues and the Soul", *Philos. Rev.* 59 (1950). esp. 464ff. and "Greek Philosophy and the Discovery of the Nerves" (forthcoming in *Museum Helveticum*; see esp. ch. 3).

[38]) Plato *Tim.* 78 ef., 80 df.; Arist. *de part. an.* II, 3.650a2ff.; *de an.* II, 4.416b28ff., *de iuv.* 4.469b11ff. etc.

as well as the *αὐξητικόν* [39]). Borrowing Cicero's words, we might say: *longa est oratio multaeque rationes* by which Aristotle brings out the decisive role of the *θερμόν* or the *θερμότης* in the process of generation [40]). Let us note that he uses the terms *θερμότης ψυχική* and *θερμότης ζωτική* [41]). On *ψυχική* we shall soon comment; *θερμότης ζωτική* expresses the same conception which underlies Cicero's *caloris naturam vim habere in se vitalem* and other similar statements. We may mention next that Aristotle in *de partibus animalium* speaks of this heat as present in the heart and in the blood vessels [42]) (from such insights the way is not long to the more specific points about the heart and the veins and arteries in *de nat. deor.* II, 24). Chapters of *de iuventute* set forth in detail by what developments the innate heat may be extinguished. For Aristotle death is not simply a *refrigeratio*; rather he holds that *refrigeratio* and some interaction between hot and cold are necessary for the preservation of life and must continue without interruption. The phases of life which lie between birth and death are determined by variations in the pattern of this interaction. The cold power (*τὸ ψυχρόν*) enters the body in the process of respiration [43]). Regarding respiration Plato, Aristotle, and the contemporary medical authorities are at one in holding that it must be understood with reference to the *θερμόν* in us. When we come to the details there is a good deal of divergence. Most thinkers are of the opinion that a "cooling" – i.e. the right degree of cooling – is necessary for the preservation of the heat [44]); yet Plato for reasons which we

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[39]) *θρεπτικόν de part. an.* II, 3.650a3ff.; 7.652b12; *de iuv.* 4.469b6–13 (*de sensu* 4.442a4–8); *αὐξητικόν*: *de part an.* III, 6.669b2ff.; *de gen. an.* V, 8.789a8; *γόνιμον*: *ibid.* II, 3.736b33ff., cf. also *de an.* II, 4.416a9–15. For the importance of the *θερμόν* for life and vital processes see *de part. an.* II, 2.648a20–b11; *de iuv.* 4, 19.

[40]) See esp. *de gen. an.* II, 1.732b28ff.; 733a34ff. Aristotle sometimes indicates that the doctrines which he works out with reference to animal physiology apply *mutatis mutandis* also to plants (see e.g. *de iuv.* 6.470a19ff.; 24.479b3). As we might expect, Theophrastus' botanical works implement this idea (see for the *γόνιμον* of the inborn heat *hist. pl.* I, 2.4; 11.1; *de caus. pl.* I, 15.1; 16.7f.; 21f.; it must also be borne in mind how central a place the concept of *πέψις* occupies in Theophrastus plant physiology; cf. *de caus.* II, 8.1. See also *de igne* 6.44).

[41]) See Bonitz s.v. *θερμότης* (327a24ff.).

[42]) The heart is *οἷον ἑστία τις de part. an.* III, 7.670a25; cf. a24; II, 7.653b5ff. (652b5ff., 27f.). See further *de gen. an.* II, 6.743b27ff., *de somno* 3.457b20f., *de iuv.* 4 pass. (esp. 469b9–16). Praxagoras too, the leading physician of Zeno's time, assumed the *θερμόν* to be operative in the veins (frg. 18 Steckerl, *The Fragments of Prax. and his School*, Leiden, 1958).

[43]) *De iuv.* 23f.

[44]) See Gal. *de usu resp.* 1 (IV, 471 K.) for Philistion and Diocles = Diocl. frg. 15 Wellmann: *τῆς ἐμφύτου θερμασίας ἀνάψυξις*; Pl., *Tim.* 70; cf. 79a–e (also 78a–79a). The physician Nicarchos regarded respiration as a *θρέψις τῆς ψυχῆς* (Gal. *de usu respir.* 1); he may well be one of those who identify *ψυχή* and the *θερμόν* (see below n. 50). For Aristotle cf. *de iuv.*, esp. chap. 5, 14, 27.

shall presently discuss seems unwilling to treat respiration as a "vital process" in the full sense of this term [45]).

This historical sketch – incomplete as it must be, especially with regard to medical doctrines – may show that the equation of the vital heat with the soul was an obvious and logical step to take. The *θερμόν* had long been *de facto* recognized as the vital principle of living beings. Materialists as they were, the Stoics would be ready to accept it in this role, provided that it could also be associated with the sublime cosmic powers and functions of the soul – powers and function on the whole identical with those which Plato had assigned to his World Soul. The cosmological arguments in *De nat. deor.* II, 31f. show that the vital heat is perfectly capable of taking on such functions. It is present in every part of the Cosmos; it is concentrated and holds undisputed sway in the celestial regions. The *caeli ardor* is simply the purest and perfect essence of this heat and therefore the ultimate source of all *γένεσις*, and since there is nothing stronger than the cosmic heat it must also be regarded as a self-mover [46]).

Must we still explain why Plato and Aristotle would not be willing to identify the vital heat with soul and why Plato in particular was anxious to keep them as far apart as was possible [47])? As long as the soul was non-material and non-physical such an identification was unthinkable. Moreover both had attributed to the soul various activities of a rather high order to which the *θερμόν* could hardly make a contribution – as a matter of fact, even Cleanthes does not entrust the vital heat with the task of thinking or other nobler functions of men and animals. Incidentally, while Aristotle would no more than Plato ever consider an identification of the soul with the *ἔμφυτον θερμόν*, we can yet see (and it is hardly astonishing) that he is prepared to go some way towards meeting the biological point of view. In the *de iuventute* [48]) we read *τὰς μὲν οὖν ἄλλας δυνάμεις τῆς ψυχῆς ἀδύνατον ὑπάρχειν ἄνευ τῆς θρεπτικῆς . . . ταύτην δ' ἄνευ τοῦ φυσικοῦ πυρός . ἐν τούτῳ γὰρ ἡ φύσις ἐμπεπύρευκεν αυτήν*. This makes the vital heat something

[45]) In the account of the *Timaeus* respiration is subsidiary to the functions of digestion and nutrition (cf. 78e, 80d).

[46]) II, 25–28; 30 *atque* – 32.

[47]) The *θερμόν* (= *πηγὴ πυρός*) of *Tim.* 79d1ff. has no connection with Plato's soul-concept; youth, old age, and death are 81b5–e explained without reference to the *θερμόν*. Contrast Arist. *de iuv.* 24. The physiology of the *Timaeus* leaves us with the impression that Plato could not ignore the *θερμόν*; he had to recognize it as having certain "powers" and as being involved in some important physiological functions (so firmly was it established in contemporary medical theory); yet he limits its powers as much as he can; it is "vital" only in the sense that it is the agent of digestion and that there can of course be no *ζῆν* without *τρέφεσθαι* (cf. 78e5).

[48]) 14.474b10ff. Cf. Rüsche, *op. cit.* (Note 36) 198ff.

like a *conditio sine qua non* for the soul. A passage of *de partibus animalium* [49]) expresses essentially the same conviction: *οἱ μὲν γὰρ τοῦ ζῴου τὴν ψυχὴν τιθέασι πῦρ ἢ τοιαύτην τινὰ δύναμιν, φορτικῶς τιθέντες. βέλτιον δ' ἴσως φάναι ἐν τοιούτῳ τινὶ σώματι συνεστάναι* [50]). The reason by which Aristotle supports his opinion is also worth quoting: *τούτου δ' αἴτιον ὅτι τοῖς τῆς ψυχῆς ἔργοις ὑπηρετικώτατον τῶν σωμάτων τὸ θερμόν ἐστιν, τὸ τρέφειν γὰρ καὶ κινεῖν ψυχῆς ἔργον ἐστί, ταῦτα δὲ διὰ ταύτης μάλιστα γίνεται τῆς δυνάμεως.* We could adduce other passages of similar content [51]) but the few here presented will go far to show that in a biological context Aristotle is quite willing to establish connections between his own more philosophical concept of *ψυχή* and the claims of the vital heat. A biologist of a less speculative bent of mind would say that if the activities of soul "are most readily effected by means of this power" (scil. the power of the *θερμόν*) he could see no reason why the soul and this power should not be regarded as one and the same entity.

From the Stoic point of view the concept of an immaterial soul was an aberration. The soul had to be a *σῶμα* [52]). Holding this conviction, the Stoics had the choice between building up a psychophysics of their own creation or accepting the knowledge available in medical circles. Being wise men, they decided for the latter course. The fire or the heat, already recognized as the *σῶμα* and *δύναμις* which soul uses [53]), was waiting to advance from the servant's place to that of the master. Such philosophical "prejudices" as

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49) II, 7.652b6ff.

50) The *τοιαύτη τις δύναμις* would be the *θερμόν* (of which Aristotle speaks in the next sentence). *οἱ μέν* may (as Peck suggests, Loeb edit., 1955, *ad loc*,) include Democritus; yet it is easy to imagine that physicians with whom Aristotle kept in contact and who knew about the crucial importance of the *θερμόν* for life and death, nutrition, growth, movement, respiration, etc. would not hesitate to identify it with the soul. For why should we assume that each of his "research associates" went all the way with him, even to the point of regarding the soul as the form or entelechy of the body?

51) E.g. *de part. an.* II, 2.648b2ff. The four basic powers, i.e. *θερμόν, ψυχρόν, ξηρόν, ὑγρόν* are said to be *αἴτια . σχεδὸν καὶ θανάτου καὶ ζωῆς,* yet also of waking and sleeping, youth and old age, health and illness. The subjects of health and illness are not covered in Aristotle's treatises (*de gen. an.* V, 4.784b26ff. shows, however, what he has in mind; cf. Philistion frg. 4 Wellmann); as regards the other subjects here mentioned by him, no reader of *de somno* and *de iuventute* will doubt that the *θερμόν* is the most important of the four powers. The *ψυχρόν* is often treated as privation (*στέρησις*) of the *θερμόν*. At *de gen. an.* III, 4.655a20 Aristotle speaks of *ἡ τοῦ ψυχικοῦ θερμοῦ φύσις* in living beings. See also III, 1.751b6 and passages listed by Bonitz s.v. *θερμότης ψυχική* (327a24).

52) *σῶμα ἡ ψυχή*: see *St. V. F. I.* 137, 142 (Zeno); 518 (Cleanthes).

53) Note also *de gen. an.* II, 4.740b29ff.: *ἡ θρεπτικὴ ψυχή* produces growth, using heat and cold *οἷον ὄργανα.*

had kept it in subjection were no longer oprative; the master's place hitherto occupied by a non-material entity was vacant. In fact we may suspect that the medical researchers had never accepted – or in any case, not wholeheartedly accepted – the distinction between master and servant [54]). The Stoics would find little fault with this attitude. If there were difficulties about equating the vital heat with the soul, these difficulties did not relate to the material character of the heat.

We can think of one such difficulty and it may be advantageous to discuss it before we return to Cicero. By the time when Cleanthes reformulated Zeno's cosmology and doctrine of principles, another physiological entity had come to the fore and had begun to challenge some of the claims made for the vital heat. This entity was the *pneuma*. Already Aristotle had recognized it as the instrument (*ὄργανον*) of the soul in the sense perceptions and in the initiation of bodily movements [55]). Naturally enough, he had wondered what kind of relationship there was between the vital heat and the vital *pneuma*; on one occasion he identifies, or comes very near to identifying them; on another he declares that all *pneuma* contains "soul heat" (*θερμότης ψυχική*) – and here he continues significantly *ὥστε τρόπον τινὰ πάντα ψυχῆς πλήρη*, a clause in which only the qualification *τρόπον τινά* prevents soul and vital heat from becoming identical [56]). Here again we must refrain from going deeper into Aristotle's doctrines. In the next half-century the *pneuma* remained associated with the functions of *αἴσθησις* and *κίνησις* (the latter term here denoting locomotion and the movement of the limbs) [57]). We now understand why in the biological section of Cicero's argument the vital heat is not brought into connection

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[54]) Cf. above note 50.

[55]) See esp. *de an. mot.* 10, *de gen. an.* II, 6.744a2, and the very difficult passage *ibid.* V, 2.781a23ff., which unfortunately cannot with confidence be regarded as authentic.

[56]) *De gen. an.* II, 3.736b30ff. (cf. my discussion of this passage in *J. H. St.* 76, 1957, 119ff.); III, 11.762a19ff.; see also below on *ἀναθυμίασις* p. 19. The relation between the vital heat and the *πνεῦμα* continued to engage medical researchers of the next generation. Two testimonies are significant: Theophrastus in his treatise on paralysis (summarized by Photius; see Theophr. frgm. 11; III, 150 Wimmer) refers to a school of thought which holds that *πνεῦμα* produces the vital heat (*τὸ πνεῦμα . . . εἶναι τὸ τὴν θερμότητα . . . ὅλως ποιοῦν*) – an entirely new idea. Praxagoras (next to Diocles the leading physician of the early third century) declared that respiration was necessary for the *θρέψις τοῦ ψυχικοῦ πνεύματος* (frgm. 32 Steckerl = Gal. *de usu resp.* 2). Before him respiration had been defined and explained with reference to the vital heat (see above p. 14). It appears that Praxagoras considered the *πνεῦμα* as altogether more important than the heat. Should he be the physician whose views Theophrastus reports?

[57]) See for a fuller discussion and references, *Mus. Helv* 18)1961), 176ff.

with these functions [58]). For the rest, it is well known that even the first Stoics defined the human soul (and the animal soul) not as fire but as *pneuma* [59]). This too is relevant to our understanding of Cicero's argument; for it is probably significant that the soul which is identified with the *calor* is not that of man (or animals) but the World Soul [60]).

In regarding the *hegemonikon* as πνεῦμα and the other parts and activities of soul – perception, bodily movement etc. – as πνεύματα or πνεῦμα currents the Stoics are once more very close to contemporary physiological thought. It is only natural that, having accepted the θερμόν as agent of vital functions, they too would speculate about the relation between this principle and the πνεῦμα and that they would wish to make this relation as close as they could without endangering the peculiar character or qualities of the πνεῦμα. Our evidence indicates that this was their endeavor but it is not very specific as to how they constructed this relationship (which would at the same time connect the psychic functions with the vital or biological functions). Zeno's definition of soul as πνεῦμα ἔνθερμον shows that he thought of the heat (θερμόν, *calor*) as preserved in the πνεῦμα; according to one report he even declared

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58) For *sensus* in *de nat. deor.* II, 23 see above Note 24.

59) See Zeno in *St. V. F.* 1.135–138, 140; Cleanthes *ibid.*, 484, 525. Pohlenz (*Die Stoa.*, I, 73f.) reports the doctrines and their intrinsic connections correctly. I doubt however whether in these particular tenets the Stoics owed as much to popular ("volkstümliche") thought as Pohlenz appears to believe. He refers to the medical thinkers but does not make sufficient use of the doctrines attested for them. To be sure, a "parallel" treatment of the developments in medical and Stoic thought has in the meantime been made easier through Steckerl's collection of the testimonies for Praxagoras (cf. Note 42). However, Philippson emphasized Praxagoras' importance without having the benefit of this collection (*loc. cit.*, n. 7, 26). Pohlenz errs in treating (*ibid.*) the treatise περὶ πνεύματος as a genuine work of Aristotle. This treatise (analyzed by Jaeger, *Hermes* 48, 1913, 58ff.) is now generally assigned to the middle of the third century. Inasmuch as it concentrates entirely on the *pneuma* and pays no attention to the vital heat it seems to fall in with the trend of the development with which we are dealing.

60) This distinction is however ignored at III, 36 in the arguments designed to refute the thoughts of our section. In some sentences of this refutation Chrysippus' definition of the soul *pneuma* as a mixture of fire and air seems to be played off against another Stoic view *nihil esse animum nisi ignem*. Did any Stoic really hold this view of the human soul? Or does the refutation in III, 35f. oversimplify (not to say, misrepresent) the opinions against which it polemizes. I am strongly inclined to think that it does. The numerous discrepancies between the exposition in Book II and the refutation in Book III present a difficult problem. It has been dealt with by Heinemann, *op. cit.* II, 162ff. and Edelstein, *Stud. it. di fil., n. s.* 11 (1934) 148ff. Both offer attractive hypotheses. My own impression is that on the whole the discrepancy is due to the kind of sources that Cicero uses. The anti-Stoic material at his disposal did not tally with the Stoic material of Book II.

θερμασίαν καὶ πνεῦμα τὸ αὐτό [61]). There being no fuller accounts, we must admit our ignorance regarding the details of the doctrine. Hypothetically I should suggest that the "evaporation" (*ἀναθυμίασις*) which nourishes and sustains the *pneuma* is produced by the "heat" in us and that it thereby forms a link between the two principles [62]).

Again Aristotle may give us some of the background for this Stoic conception. In the treatise now usually called *de iuventute* we read of an *ἀναθυμίασις* produced by the action of the *θερμόν* in the body upon moisture which is in the process of changing into blood; simularly in the *de generatione animalium* Aristotle, while dealing with the formation of the foetus, declares: *πνεῦμα* must be present because there is liquid substance and heat (*θερμόν*), the latter as active factor, the former as passive [63]). Ideas of the kind might be welcome to the Stoics; but since the Aristotelian passages dealing with *ἀναθυμίασις* are few and no corresponding doctrines of medical thinkers are recorded [64]), we cannot carry the comparison very far [65]) and must content ourselves with

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[61]) *St. V. F.* I. 127, 135. Note in this connection Theophr. *de igne* 6.44 *τὸ πῦρ οἷον πνεύματός τις φύσις* (see also 13.76). *St. V. F.* I, 127 (= Ruf. *de nom.* 228) hardly deserves the confidence with which G. Verbeke, *L'évolution de la doctr. du pneuma* (Paris–Louvain, 1945) 21 approaches it; in the context in which we find it we could not expect any awareness of nuances and even less an appreciation for the subtleties of Stoic thought. Verbeke goes too far (*ibid.* and 69) when he sets up the *πνεῦμα* as Zeno's *ἀρχή* and regards the four elements as "produits" by it.

[62]) For the (physiological) *ἀναθυμίασις* as conceived by the early Stoics cf. *St. V. F.* I, 139–141, 519–521, II, 778–783. It is particularly important that the *ἀναθυμίασις* arises out of the blood and that the soul *pneuma* is "nourished" by the blood.

[63]) *De iuv.* 26.480a2–7 (cf. 7–62); *de gen. an.* II, 6.742a15. The *θερμόν* seems also in *de sommo* 3.456b18–24 and 457b31ff. to be the agent or the cause of the *ἀναθυμίασις*; note the function of the blood 456b2 and also that 457a12 Aristotle refers to the *ἀναθυμίασις* as *πνεῦμα*. Cf. *Aristotle's System of the Phys. World* 407.

[64]) Galen (*de usu respir.* 5 = *St. V. F.* II, 783) says that "outstanding physicians" shared with the philosophers the conviction that the soul *pneuma* is nourished by the exhalations of the blood. Unfortunately he does not name these physicians. Franz Rüsche, *op. cit.* (Note 36) 148ff. reconstructs such an exhalation theory for Diocles. In my opinion the reconstruction rests on assumptions, especially regarding the thoughts behind Plato *Tim.* 70b, which we have no right to make. It would not surprise me to learn that Diocles had this theory but so far this has not been proved.

[65]) We might arrive at more definite conclusion if we knew what Aristotle has in mind *de an. mot.* 10.703a11 where he says that he has elsewhere explained the *σωτηρία τοῦ ἐμφύτου πνεύματος*. Is it his idea that the *πνεῦμα* is "nourished" by the *ἀναθυμίασις* i.e. the pneumatization of the blood by action of the *θερμόν*? This would bring his thought rather close to the Stoic conception of *ἀναθυμίασις*. Yet where Aristotle deals with this process he never speaks of it as preserving the innate *pneuma*. This must give us pause; we cannot use the passage in *de an. mot.* with confidence.

stating the likelihood that the Stoics owe *ἀναθυμίασις* to the same schools from which they received the concepts of vital heat and of the *pneuma*. Stoic originality lies not in the creation of such concepts, nor in their application to biological phenomena; where they did break new ground was in transferring them to physics, cosmology, and even theology.

To be sure, the Stoics were not the first to assert that the heat in us is identical with that spread out in the celestial regions or that the *pneuma* of our soul has its cosmic counterpart. More than one Presocratic thinker seems to have known identities of such kind and more than one may have emphasized them. If it makes us unhappy that for the world-picture of these men we have by and large to rely on "reconstructions", we may look at the Hippocratic treatise *περὶ σαρκῶν* where the *θερμόν* that builds up our body is *disertis verbis* declared to be the same which at the beginning of things "in the general commotion" took up its place on the circumference of the world [66]). Yet since the days of the early Presocratics and Hippocratics biology and cosmology had moved apart. In biological thought the *θερμόν* had been made the agent of vital physiological processes; in physics and cosmology the relations between the fire and the *θερμόν* had become considerably more complex and controversial, and the fire itself had been forced to yield its control of the heavenly regions to another element, the *aether* [67]). By 300 B.C. it was more difficult to establish the identity of the vital heat in us with the cosmic fire than it had been in the fifth century. New premises had to be used, new arguments to be fashioned.

We may seem to have lost contact with our Cicero passages but all that we have set forth goes to show that by Cleanthes' time – or more generally speaking, at that time when the Stoic system originated – the biological doctrines embodied in II, 23f. had been formulated [68]) and that these doctrines suggested a concept of soul. We have also come to understand why the author of our argument readily uses these doctrines as basis for a concept of the

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[66]) "Hipp." *de carn.* 2. For the Presocratics cf. W. K. C. Guthrie, *Harv. Theol. Rev.* 45 (1952). 87ff. and *In the Beginning* (London and Ithaca, N.Y., 1957) 50, 58 and pass. Pl. *Phil.* 29c is usually cited in this connection.

[67]) This subject is too large to be adequately treated on this occasion. I have dealt with some aspects of the developments in *Aristotle's System of the Phys. World* 342ff. For the aether as introduced by Aristotle in the role of a fifth element see *ibid.* 287ff. and n. 1.

[68]) There remain two points in which our philosopher may go slightly beyond the theories of the professionals. One is the *aequabilis motus* of 23, the other the *imitari igneam celeritatem* of 24. We must of course bear in mind how limited our knowledge of the professional doctrines is. All that we are able to compare is the fragments of Diocles and Praxagoras.

World Soul but does not go quite so far regarding the individual soul. Here he confines himself to the functions that had not become associated with the *pneuma*. For while the *pneuma* is inseparably linked to the heat it is not altogether identical with it. To explain the relationship and to set forth what the vital *pneuma* owes to the vital heat would have deflected the argument from its straight course. Very understandably our author was content to have shown that life and the vital functions of men, animals, and plants are bound up with the *θερμόν*.

In the first century B.C. the vital heat was still a valid concept. To deny that a philosopher of that period could make it the key concept of his physics would perhaps be rash. The stone which other builders have neglected may by an architect of genius be chosen as the cornerstone. But life and its functions had by that time become firmly associated with the *pneuma* as their physical substratum. By comparison with this elastic and subtle spirit the vital heat would be something rather "primitive"; to select it as bearer of divine powers would be almost indicative of an anti-intellectual attitude. I am aware that this argument may play into the hands of the Posidonius school; for there can be no doubt that Posidonius reacted against the extreme rationalism of the orthodox Stoic tradition [69]). Still it would have been disingenuous to conceal an aspect of the situation which may be exploited by both parties-as long as our problem is discussed in terms of general probabilities. When we turn from these to an assessment of the actual evidence we find the scales heavily weighted for Cleanthes.

Apart from the controversial sections of *De natura deorum* there is nothing to prove Posidonius' enthusiasm for the vital heat in living beings or in the Cosmos. Let us grant that to explain the nature and origin of the stars he credited the *aether* with the power of *ζῳογονία* [70]), and let us recall his definition of the deity as *πνεῦμα νοερὸν καὶ πυρῶδες οὐκ ἔχον μὲν μορφήν, μεταβάλλον δ'εἰς ἃ βούλεται καὶ συνεξομοιούμενον πᾶσιν* [71]). How close are these views

[69]) He certainly did so in his theory of the emotions (*πάθη*); cf. Pohlenz I, 224ff., II, 112, (also for further references); A. D. Nock, *J. R. S.* 49 (1959) 10f.

[70]) Cf. Reinhardt, *Kosmos* 61–81; *R.E*, 660. I see no reason to doubt that Posidonius propounded views of the kind. How original he was in them would be another question. Aristotle's precedent is probably more important than Reinhardt admits, and if my opinions regarding Cleanthes are correct they too would entail certain qualifications of Posidonius' originality in these matters. As I see it, "vitalism" is a part of the tradition rather than a novel and unorthodox approach. It would also follow that our section of *De nat. deor.* II cannot be used for the reconstruction of Posidonius' system and that what Reinhardt derived from it is no longer valid.

[71]) Aét. I, 7.19 (Diels, *Doxogr.* 302); cf. Reinhardt, *Kosmos* 276. As

to the argument of Cicero in *De natura deorum* II, 23–28, 30 *fin.*–32? Of Cleanthes we know that he described the heat in "the bodies of living beings" as *vitalis* and *salutaris* and assigned to it the functions of *conservare, alere, augere, sustinere, sensu afficere* [72]) (all five of which are well represented in our section). Add that already for Zeno the fire (πῦρ) was αὐξητικὸν καὶ τηρητικόν (cf. for the latter predicate *conservare* and *sustinere*) ... ὃ δὴ καὶ φύσις καὶ ψυχή [73]), that Cleanthes is cited in the *De natura deorum* for the identification of the divine with *naturae animus* and with *caeli ardor*, that he is the only author mentioned by name in our argument, and finally that this whole argument, as I hope to have proved, is one compact and intrinsically consistent *naturalis ratio.* The argument does not operate with the concept of συμπάθεια; nor does it treat the Cosmos as an organism [74]). The only bond between the elements would be the participation of all in the *vitalis calor.* The items of "empirical" evidence embodied in 23f. are not indicative of a philosopher's peculiar *forma mentis* (for there is hardly one among them that could be regarded as novel or original). As for the proofs advanced in 25–27, they represent a combination of empirical and of speculative reasoning and may well be also a combination of old and new ideas [75]). Could any expert in intellectual physiognomy trust himself to recognize in them a particular philosopher – or to exclude a particular philosopher? I do not see why the thinker who devised them should have been "eye-minded"; he clearly had a thesis to defend and did not find it altogether easy to prove that the vital heat is

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Heinemann, *op. cit.* (Note 7) II, 177 observes, Posidonius would rather present arguments to the effect that God is *pneuma.* Unfortunately Heinemann does not draw the obvious inference that the arguments of our section are not likely to have originated with Posidonius. Instead, going off in an entirely different direction, he reasons that Cicero would not report arguments aimed at equating the deity with *pneuma* because he was unable to refute them in Book III (*ibid.* 178; cf. 164). This is unconvincing for anyone who does not accept Heinemann's rather complex theory regarding the relation of Books II and III.

[72]) See above p. 7.

[73]) *St. V. F.* I, 120.

[74]) The analogy employed in 26 (*quod nostris quoque corporibus contingit*) strikes us at first glance as a piece of "naive" anthropomorphism. It is not necessary to regard it as such but no more do we need to go to the opposite extreme of discovering behind it a deep-seated conviction that the macrocosm is an organism or ζῷον (Reinhardt, *Pos.* 225). There is no trace of this "organic" world view anywhere else in the argument. The analogy gives the impression of being an improvisation.

[75])The concentration of the "hot power" under the influence of its opposite, the cold of winter (25), is the process which Aristotle knows under the name of ἀντιπερίστασις; see *Aristotle's System* 412f. (Theophrastus too uses this motif repeatedly, e.g. *de igne* 15–18; *de sudore* 23, 40; for other passages see Wimmer's Indices in the Teubner edition s.v.). Another doctrine traceable

insitum in every element of the world [76]). All told, there are good reasons for attributing our argument to Cleanthes, while it is hard to find even one item that recommends the authorship of Posidonius.

There can be no doubt that the early Stoics recognized Heraclitus as their ἀρχηγέτης and made the most strenuous efforts to find their doctrines about the fire, about the nature of the soul, about ἀναθυμίασις, and also about the λόγος anticipated in his utterances. They were past masters in exegesis – but are contemporary scholars, who treat the Stoic exegesis of Homer and Hesiod with a smile or a shrug of the shoulders, well advised if they accept the Stoic interest in Heraclitus as basis for their own appraisal of Stoicism and its place in the history of Greek thought? Surely what we mean by historical understanding has little in common with the Stoic attitude to tradition and the past. In building up their system the Stoics did not ignore the new positions which Plato [77]) and Aristotle had won for philosophy. To be sure, they rejected some of their ideas but they also accepted not a few of them. Students of Greek philosophy have so far failed to examine

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to Aristotle's *Meteorologica* – but just as well to earlier physical systems – is the explanation of air as evaporation of the water (Arist. *Meteor.* I, 3.340b24ff.; cf. *Aristotle's System* 397 and passim). For fire as causing the melting of the ice and the flowing of the water (26) we may compare Plato *Tim.* 58 e f. (but let us note that the author of our argument finds it necessary to modify Plato's explanation; for him the fire must be *insitum* whereas the cold comes from the outside). For the trend of the reasoning in 25 cf. Empedocles A 68, B 52.

[76]) See 27 *init.* and note that the author needed *multae rationes* to prove that the γόνιμον θερμὸν of plants is contained in the earth – and not primarily in the plants themselves? Theophrastus' *de caus. plant.* would leave us with the impression that it must have been difficult to strike a judicious balance between these two points of view.

[77]) Our subject has given us no opportunity for dealing with instances of Platonic influence. See e.g. Jaeger, *Scripta min.* (Rome, 1960) II, 346 and my *Plato's Theology* (Ithaca, N.Y., 1942) 163, 183f. The evidence used by H. Siebeck in "Die Umbildung der peripat. Naturphilos. in die der Stoiker" (*Untersuchgg. zur Philos. d. Griechen*, Freiburg, 1888, 181ff.) is no longer adequate, yet some of his suggestions e.g. regarding the continuity between the Aristotelian and the Stoic αὐτοκίνητον (232ff.) retain their validity; cf. above p. 10. Verbeke, *op. cit.* (Note 61) 68f. offers valuable observations about the motif of active and passive elements in Stoic thought and its connection with Aristotle. Another Aristotelian concept which proved most useful for Stoic physics is ὕλη. In a recent paper ("Aristotle's word for Matter", *Didascaliae, Studies in Honor of Monsignore Albareda*, New York, 1961) I have dealt with the origins of this concept and at the same time studied Aristotle's conception of nature as operating in the fashion of a craftsman. It need hardly be said that this thought too was accepted and developed by the Stoics. Cf. Joseph Moreau, *L'ame du monde de Platon aux Stoiciens* (Paris, 1939) 173f. It is not possible here, even by way of a first approximation, to circumscribe the area of Platonic and Aristotelian influence.

this debt systematically and are therefore inclined to underrate its extent. Besides being deeply in the debt of Plato and Aristotle, the Stoics owe much to leading medical authorities, such as Diocles and Praxagoras, men who were themselves thinking in Aristotle's concepts even if they did not endorse all his speculative interpretations and inferences. The Stoics themselves would doubtless say that their conception of the vital heat or the fire had been inspired by Heraclitus' precedent. This should not prevent us from finding the roots of these thoughts in the physiology of their own day and of the immediately preceding generations.

It may here be well briefly to return to a point made on an earlier page. If Cleanthes around 250 in trying to reinforce or to develop Zeno's authoritative teachings, put so much trust in the *ἔμφυτον θερμόν*, did he not fall behind the advances made by scientific research? As far as we can make out, this vital principle had had its day; the leaders of medical thought tended more and more to favor the *pneuma* at the expense of the *θερμόν* [78]). We should not pretend to know very much about the developments in medical thought yet it seems probable that there was a "time lag" between these developments and the acceptance of the new medical doctrines by the Stoics. However this consideration need not give us pause. We need not take back anything of what we have said about the debt owed by the Stoics to medical research but should add that it was their fate to lag behind the progress of this research. When Chrysippus decided to reorganize the physical system and in this process elevated the *pneuma* to the central place hitherto occupied by the fire [79]), it was again too late. In the meantime another generation of medical researchers had discovered the nerves as the carriers of the *pneuma* and had, in following up their discoveries, concluded that the *pneuma* which controls sense functions and bodily actions is dispensed not by the heart but by the brain and that the brain must therefore be the seat of the *hegemonikon*. All these conclusions Chrysippus was utterly unwilling to accept [80]).

One more historical perspective may here be presented, with the idea that if it is correct it furnishes us with an additional argument

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[78]) See above p. 17 and n. 56.

[79]) Cf. Pohlenz, I, 74. See above Note 59. According to Tertullian (*Apol.* 21 = *St. V. F.* I, 533). Cleanthes too knew the *πνεῦμα πάντα διῆκον*. This testimony is not quite easy to square with the overwhelming evidence which favors the *πῦρ* (= *θερμόν*). However, as we have seen, it is relatively easy to find a way from the one concept to the other. See also J. D. Meerwaldt, *Mnem.* ser. IV, 4 (1951), 49.

[80]) Cf. *St. V. F.* II, 879ff.; esp. 897. For a fuller discussion see *Mus. Helv* 18 (1961), 188 fl.

for an early Stoic as Cicero's source. In the Tenth Book of the *Laws* Plato while scrutinizing the cosmological systems of the Presocratics finds one basic fault vitiating all of them. The principles on which they rely in their accounts of nature and the Cosmos are lifeless principles [81]). Being of a purely material kind and operating in accordance with mechanical laws, these principles cannot account for the phenomenon of life. While refuting the physicists, Plato comes forward with a new and better principle, the world soul [82]). Understood as *ἀρχὴ κινήσεως*, the world soul ensures the presence of life in nature. Plato doubtless means to counteract a tendency which had lately prevailed in cosmological speculation; he wishes nothing less than to reverse its direction [83]). Was his criticism heeded? Aristotle makes a brave attempt to endow the elements of his system with self-movement – a concept which in any case is close to that of life; but as he is also intent on developing Plato's conception of a first mover as source and origin of all changes or movements in the Cosmos, he finds it necessary to take away again from the elements most of the self-moving capacity with which he had originally invested them. In the passage of *Physics* VIII where he performs this curtailing operation he actually says that to move by one's own impulse is *ζωτικὸν καὶ τῶν ἐμψύχων ἴδιον* [84]). Moreover, Aristotle's First Mover is, unlike the Platonic World Soul, outside the Cosmos, and Aristotle has given up the idea that this mover should be a soul.

It is easy to understand that with regard to most of these departures the Stoics would refuse to follow Aristotle's lead – they seem to have been considerably more attracted by theological arguments and ideas of his earlier period, e.g. the self-motion of the celestial element, the divinity of the heavenly bodies, and the manifestation of the divine in the order and beauty of the world [85]). However, our question should be whether they paid attention to the critical points made by Plato in *Laws* X and whether they considered Plato's postulate of alive principles as binding for their own physics. Surely if the basic substance of the world had to guarantee and explain the presence of life, no better choice could

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[81]) *Legg.* X, 889b f.; 891c. Cf. on this criticism of the Presocratic cosmologies my comments in *Plato's Theology* (Ithaca, N.Y., 1942) 133ff.

[82]) *Ibid.* 891e ff., 892c, 894c–896c. For the "life" motif in particular see 895c ff.

[83]) Cf. *Aristotle's System* 14ff.

[84]) *Phys.* VIII, 4.255a6. I deal briefly with these developments because I have treated them recently at greater length *op. cit.* 95ff., 100ff., 232ff.

[85]) Cf. *de nat. deor.* II, 17, 94f.; see also above Note 30. Other points (such as the identity of the Stoic author used in *de nat. deor.* II, 44 where Aristotle is cited) are controversial.

be made than the vital principle itself, i.e. the entity which physiologists and philosophers had long recognized as the agent of life and of vital functions. This was a "material" principle and in this respect in a class with the ἀρχαί mercilessly criticized by Plato; and yet it could be considered immune to Platonic criticism. Moreover all that was, from the Stoic point of view, valid in Plato's conception of a world soul could be transferred to, and associated with, this principle.

Still it may be rash to assume that Plato's critique was still effective and that the Stoics selected their principle in deference to it. Let us therefore look at Plato's arguments merely as initiating a new development in cosmology and let us simply ask whether the alternative of alive or lifeless principles was still an acute issue at the time when the first Hellenistic systems took shape.

Fortunately there is evidence in the light of which we may decide this question, although it is not the Stoics themselves but their adversary, Epicurus, who supplies us with this invaluable testimony. Epicurus himself preferred to posit lifeless *principia* and was satisfied that life could arise by the suitable combination of such *principia*. But where he advanced this theory he found it necessary to bring a battery of arguments into action against thinkers holding the opposite view. In Lucretius who has preserved these arguments [86]) the adversaries are not identified, but Robin is probably right in regarding the polemic as aimed at the Stoics [87]). For to suppose that Epicurus directed his shafts over the heads of the Stoics – and over that of Aristotle and perhaps some other heads – against Plato's own position would seem a *tour de force*; so unusual a procedure on his part could only be understood on the assumption – that the issue raised by Plato was still alive [88]).

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[86]) II, 865–990.

[87]) A. Ernout and L. Robin, *Lucrèce, de r. n., Commentaire* (3 vols., Paris, 1925–1928) *ad loc.* Cyril Bailey (*Titi Lucreti Cari de r. n. libri sex*, 3 vols., Oxford, 1947, and II, 886ff. and 973ff.) admits Stoic adversaries for vv. 931–972, where we are actually on less certain grounds; for the other sections he suggests Anaxagoras as the target of the polemic. This suggestion seems to me unfortunate. Nothing justifies the conjecture that the theory of the ὁμοιομερῆ implies sentient particles (infinitely divisible sentient particles?). Nor would it suffice if Anaxagoras "would say" something of the kind. The adversaries must have advanced many arguments in support of their opinions (vv. 886ff.). Anaxagoras is much more likely to be one of those to whom Plato's critical strictures apply (see *Legg.* 895a6).

[88]) The argument of the opponents summarized in vv. 886ff. has a certain similarity with Plato *Legg.* X, 889b, the point of both passages being that the κρᾶσις of lifeless objects cannot produce life. What Lucretius here reports is probably a new version of the Platonic argument. Epicurus (as far as we can judge from Lucretius' rendering) did not present many of the arguments used by his adversaries but gave most of his effort to working out the logic of his own position.

Actually, whoever the adversaries may be, the tenacity with which Epicurus argues his case leaves no doubt that the problem was to his mind an acute and vital one. *Tunc porro quid est animum quod percutit ipsum/ quod movet et varios sensus expromere cogit/ ex insensilibus ne credas sensile gigni*? Such language is not used by a thinker who revives an issue that has exercised earlier generations but has in the meantime been forgotten or superseded (nor would there be any reason for supposing that Lucretius' own temperament infused new life into this question) [89]). Moreover if, with this section of Lucretius' Second Book in mind – or even without bearing it in mind – we compare the Stoic and the Epicurean stand on the issue we arrive at the same conclusion. While the early Stoics chose as their *principium* an entity by common consent recognized as the source of life and the agent of vital processes, Epicurus went to the opposite extreme, frankly declaring all atoms to be dead and refusing to follow Democritus who had treated one type of atoms, the spherical, as the bearer of soul and life[90]).

From whatever point of view we examine the proofs contained in our section of *de natura deorum II*, the logic of history suggests that they had their place in an early Stoic system. Their author is not Posidonius but Cleanthes. "Vitalism" has a long and complex history in Greek thought. We have just seen that even Plato made an important contribution to it. The Empedoclean tradition and Aristotle demand a place in this history no less than early Hellenistic physicians and early Stoics. Vitalism is not simply one philosopher's *Weltgefühl* and attitude to nature.

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[89]) On the contrary, II, 992–1001 indicates that Lucretius' temperament would rather lead him to favor the opposite theory. This is one of the instances where the poet in him is in conflict with the Epicurean. However the analysis of II, 992ff. under this point of view would require a special study.

[90]) See *Vorsokr.* 68A101, 104.